

CLAIMS

We claim:

5
1. A modular multifunction field-deployable apparatus comprising:

10 a ring support element, said ring support element comprising at least one substantially tubular and inflatable ring, said ring support element defining a vacant center;

at least one inflation means for inflating said ring support element;

15 at least two pressure-deformable membranes extending across the center of said ring support element, said membranes and said ring support element defining at least one inflatable reflector chamber, at least one of said membranes having a means for reflecting electromagnetic radiation; and

20 at least one pressure adjusting or inflating means for adjusting the pressure within said reflector chamber.

25 2. The apparatus according to claim 1, wherein said ring support element and said membranes are made from substantially thin, strong, and flexible sheets of at least one type or class of substantially polymeric materials,

30 whereby said apparatus is suitably lightweight, compactly foldable, and sufficiently durable for ease of transport to and substantially safe and dependable use in a range of terrestrial and non-terrestrial environments.

35 3. The apparatus according to claim 1, wherein said inflation means and said pressure adjusting means are at least one valve comprising a flexible conduit closed by a closure means selected from the group consisting of:

an affixed flexible plug;

a flexible tongue-and-groove or Ziploc-type valve;

a self-sealing membrane valve;
a clamp; and
a tie.

5 4. The apparatus according to claim 1, further comprising
at least one accessory device attached to said apparatus, the
accessory device being selected from the group consisting of:

10 a handle;
an apertured tab for hanging when in storage;
a tying or hanging strap;
a storage pouch for storing the deflated and folded
apparatus; and
a pouch for filling with dense material to stabilize
the apparatus.

15 5. The apparatus according to claim 1, further comprising
at least one fastener device attached to said apparatus, the
fastener device being selected from the group consisting of:

20 a clevis;
a clip;
a bracket;
a mounting stud;
a socket;
a line; and
25 a hook-and-loop fastening patch.

6. The apparatus according to claim 1, wherein the
plurality of pressure-deformable membranes are at least two
reflective membranes including a primary reflective membrane and
30 at least one redundant or auxiliary reflective membrane, wherein
each of said reflective membranes has predetermined functional
characteristics, whereby said reflective membranes may have
identical or dissimilar functional characteristics.

35 7. The apparatus according to claim 1, further comprising
at least one access port having a fluid-tight cover, whereby
materials and equipment may be added to and removed from the
apparatus.

8. The apparatus according to claim 1, wherein at least one of said pressure-deformable membranes has at least one outlet duct or port, whereby substantially fluidic materials can be transferred to, from, or through at least one said reflector chamber.

9. The apparatus according to claim 8, wherein said port has a conduit extending through said reflector chamber, whereby substantially fluidic materials collecting on the top of the apparatus are drained through said conduit to an external location substantially below said reflector chamber.

10. The apparatus according to claim 1, wherein said ring support element comprises at least two of said substantially inflatable and tubular rings, at least one of said rings being attached to and above at least one other of said rings substantially above said pressure-deformable membranes,

whereby the external volume capacity of the apparatus is increased and an inflatable focal point support element is provided.

11. The apparatus according to claim 1, wherein said ring support element comprises at least two of said substantially inflatable and tubular rings, at least two of said rings being located between at least two of said pressure-deformable membranes,

whereby the internal volume capacity of the apparatus is increased.

12. The apparatus according to claim 1, further including at least one gutter attached to said ring support element for capturing falling materials, whereby the effective capture area is increased.

13. The apparatus according to claim 1, further comprising at least one stretched elastic band attached to at least one

surface of at least one of said pressure-deformable membranes to cause wrinkling as a safety means.

14. The apparatus according to claim 1, further including at least one cover attached to at least one point of said apparatus as a safety means, said cover being rollable into a retracted position.

15. A modular field-deployable apparatus substantially optimized for use as a radiant electromagnetic energy concentrating, focusing and beaming apparatus comprising:

a ring support element, said ring support element comprising at least one substantially tubular and inflatable ring, said ring support element defining a vacant center;

at least one inflation means for inflating said ring support element;

at least two pressure-deformable membranes extending across the center of said ring support element, said membranes and said ring support element defining at least one inflatable reflector chamber, at least one of said membranes having a means for reflecting electromagnetic radiation;

at least one pressure adjusting or inflation means for adjusting the pressure within said reflector chamber; and

at least one means for performing at least one function not involving concentrating, focusing, and beaming radiant electromagnetic energy, said means selected from the group consisting of:

a means for collecting fluid;

a means for storing fluid;

a means for distributing fluid;

a means for processing fluid;

a means for fermenting materials;

a means for storing material;

a means for providing waterborne flotation;

a means for providing snowborne transportation;

a means for providing a compliant support;

a means for immobilizing a broken limb;

a means for concentrating sound;
a means for providing electrostatic insulation;
a means for providing thermal insulation; and
a means for providing electromagnetic insulation,

5 whereby the apparatus also provides at least one non-electromagnetic or non-focused electromagnetic function.

16. A method of establishing at least one function or
element of life-sustaining infrastructure utilizing a modular
10 field-deployable apparatus comprising the steps of:

 providing a ring support element, said ring support element
 comprising at least one substantially tubular and
 inflatable ring, said ring support element defining a
 vacant center;

15 providing at least one inflation means for inflating said
 ring support element;

 providing at least two pressure-deformable membranes
 extending across the center of said ring support
 element, said membranes and said ring support element
20 defining at least one inflatable reflector chamber, at
 least one of said pressure-deformable membranes being
 reflective to electromagnetic radiation;

 providing at least one pressure adjusting or inflation
 means for adjusting the pressure within said reflector
25 chamber; and

 deploying said ring support element and said pressure-
 deformable membranes in a manner effective for
 performing a selected function.

30 17. The method according to claim 16, wherein the
 deploying step comprises the following steps:

 inflating said ring support element to support and tension
 the periphery of said pressure-deformable membranes;

35 adjusting pressure within said reflector chamber to deform
 at least one reflective membrane into a functional
 concave reflector; and

 positioning the reflective membrane in a manner effective

for allowing transmission of radiant electromagnetic energy between a source and target,

whereby an energy absorbing object placed in proximity to the focal point can absorb concentrated radiant electromagnetic energy for at least one application selected from cooking, heating, and processing of materials, electrical power generation, receiving electromagnetic communications or signals, and providing illumination, and

whereby an energy emitting object placed in proximity to the focal point can project radiant electromagnetic energy for at least one application selected from transmitting electromagnetic communications or signals, and providing illumination.

18. The method according to claim 16, wherein the deploying step comprises the following steps:

inflating said ring support element to support and tension the periphery of said pressure deformable membranes; adjusting pressure within said reflector chamber to deform at least one membrane into a substantially concave surface; and

positioning said apparatus in a substantially horizontal orientation with the substantially concave surface facing upward,

whereby said apparatus can capture and/or hold substantially fluidic materials including, for example, precipitation, leaking fluids, draining fluids, and/or moderately sized solid materials, and

whereby said apparatus can support persons or objects on land and on water.

19. The method according to claim 16, wherein the deploying step comprises the following step:

positioning said apparatus between an element and the surrounding environment to shield or insulate said element from said environment,

whereby said apparatus can provide thermal, electrostatic, and electromagnetic insulation.

20. A modular multifunction field-portable apparatus comprising:

5 a ring support element, said ring support element comprising at least one substantially tubular and inflatable ring, said ring support element defining a vacant center;

10 at least one inflation means for inflating said ring support element;

at least two pressure-deformable membranes extending across the center of said ring support element, said membranes and said ring support element defining at least one inflatable central chamber; and

15 at least one pressure adjusting or inflation means for adjusting the pressure within said reflector chamber,

whereby the apparatus provides at least one non-electromagnetic function.